

Assessing Risk: *Type 2 Diabetes and Pre-Diabetes*

Criteria for Testing

Children who meet the following criteria should be tested every two years starting at age 10 or at onset of puberty, if it occurs at a younger age:

At Risk of Overweight

(BMI>85th percentile for age and sex, weight for height>85th percentile),

Or

Overweight

(BMI>95th percentile for age and sex, weight for height>95th percentile)

Plus

Any two of the following risk factors:

- Family history of type 2 diabetes in first- or second-degree relative
- Race/ethnicity (Native American, African-American, Hispanic, Asian/Pacific Islander)
- Signs of insulin resistance or conditions associated with insulin resistance [acanthosis nigricans, hypertension, dyslipidemia, polycystic ovarian syndrome (PCOS)]

Clinical judgment should be used to decide to test symptomatic patients who do not meet these criteria.

Recommended Screening

Children who are determined to be at risk should have a fasting plasma glucose (FPG) test. Fasting is defined as no consumption of food or beverage other than water for at least eight hours before testing.

For children with a FPG \geq 100, consultation with a specialist in obesity management (endocrinologist , gastroenterologist) or at a multidisciplinary clinic for obesity management may be considered. Additional testing by the primary care physician may be helpful, including an oral glucose tolerance test (OGTT), fasting lipid profile and other studies as recommended by the specialist prior to the consultation. Most laboratories are familiar with OGTTs. An OGTT should consist of a standardized glucose load of 1.75g/kg body weight (maximum dose of 75g). A fasting blood glucose is measured at 0 minutes, immediately prior to ingesting the prescribed glucose load. A repeat blood glucose is obtained 120 minutes later. The patient cannot drink or eat (other than the prescribed glucose load) between blood tests.

If the FPG is \geq 126, the primary care provider should contact the specialist directly to determine how soon the child needs to be evaluated.

Background

This card is a tool for assessing risk and screening children for type 2 diabetes (nonimmune-mediated) and pre-diabetes. Information about the epidemiology of type 2 diabetes in the pediatric population is limited, largely due to the relatively recent recognition of its emergence in children. The included criteria are based on a consensus statement developed by the American Diabetes Association and endorsed by the American Academy of Pediatrics. The statement's authors acknowledge that, currently, there are insufficient data to make definite recommendations regarding testing in asymptomatic children.

"Pre-diabetes" is a designation that applies to individuals whose blood glucose levels do not meet the criteria for diabetes, but are too high to be considered normal. It represents an early stage of impaired glucose handling and is associated with a relatively high risk of progression to type 2 diabetes. In pre-diabetes, the child has impaired fasting glucose (IFG is fasting plasma glucose of 100-125 mg/dl) and/or impaired glucose tolerance (IGT is a plasma glucose of 140-199 mg/dl 2 hours post glucose load).

"At risk of overweight" and "overweight" are the terms preferred to refer to children and adolescents whose excess body weight could pose medical risks. Due to potential negative connotations associated with the term "obesity," "overweight" is preferred. Using the 2000 CDC growth charts, "at risk of overweight" for ages 2 to 20 years is defined as a Body Mass Index (BMI)-for-age between the 85th and the 95th percentiles. "Overweight" in children is defined as a BMI-for-age at or above the 95th percentile on the charts. BMI is weight in kilograms divided by height in meters squared (kg/m^2).

Sources:

American Diabetes Association, "Consensus Statement: Type 2 Diabetes in Children and Adolescents", in Diabetes Care Vol. 23 No. 3, March 2000, pp 381-389. This statement was also endorsed by the American Academy of Pediatrics and published in Pediatrics Vol. 105 No. 3 March 2000, pp 671-680.

American Diabetes Association, "Standards of Medical Care in Diabetes", in Diabetes Care Vol. 28, Supplement 1, January 2005.

Barlow, Sarah E., MD, MPH and Dietz, William H., MD, PhD, "Obesity Evaluation and Treatment: Expert Committee Recommendations", in Pediatrics Vol. 102 No. 3 September 1998.

Center for Disease Control, "Growth Chart Training Module, Overweight Children and Adolescents: Screen, Assess and Manage", available on the web <http://www.cdc.gov/nccdphp/dnpa/growthcharts/training/modules/module3/text/intro.htm> Note: The definitions of "at risk for overweight" and "overweight" used on this card are adapted from this publication.

National Diabetes Education Program, "Guiding Principles for Diabetes Care: For Health Care Providers," April 2004. Note: the definition of "pre-diabetes" used on this card is adapted from this publication.